

pharmacy after a course of three. Independent of the University are the Military Academy and the Engineering College, the last two out of the six years' course of the latter being spent in practical applications. Technical education is divided into chemical and mechanical. There are higher schools in the country for nearly every special purpose; but with all this carefully-proportioned system the titles and objects of thirty societies show how thoroughly the English system of voluntary association is making its way as a method of supply to educational demand.

ON presenting to the St. Petersburg Academy of Sciences his new researches into the language of his "Codex Comanicus," published by Count Kunn, Prof. Radloff made a few remarks well worthy of attention (*Bulletin*, vol. xxxi. No. 1). After having carefully catalogued all words appearing in the "Codex," Prof. Radloff has collected, under each separate word, the words akin to it in different Turkish dialects, so as to show their kinship at once. It appears that the Comanic dialect belongs to the great group of Turkish dialects which M. Radloff describes as the Kypchak group; the parent language having been spoken from the ninth to the thirteenth centuries by those Tartars who inhabited the Steppes from the Altai Mountains to the Black Sea. They now comprise the Abakan Tartars, the Barabintsys, the Irtysh and Kazan Tartars, and the Kirghizes. The "Codex" thus offers a sample of the oldest language spoken by the Kypchak stem. After having concluded his researches into this dialect, Prof. Radloff will devote his attention to the Uigur languages, for which we have so rich a material; and then he will take up the third group of the Seldjuck languages. Only after such an inquiry, he says, may we hope to attain a thorough knowledge of the whole of the Turkish languages, because all the newer material, and much of the older, belongs to the artificial written languages. The Osman and the Jagatai (or East Turkish) dialects are not representatives of defined groups of dialects, but artificial languages based, the latter on the Uigur language, and the former on the Seljuk, with a mixture of different other dialects. As to the Kazan written language, it is a most varied mixture, in which Osman are mingled with Djagatai forms, while the people are acquainted with neither of them.

WE have received the *Proceedings* of the Windsor and Eton Scientific Society for the past year. It contains reports of a few lectures on general scientific subjects. We do not see any evidence of that local scientific work for which these societies are so remarkable, and which is the most beneficial outcome of their activity. Still, the President, who must be a good judge, in his address for the year states that the Society is steadily but surely making its mark as one of the many aids to intellectual improvement which are offered to the people of Windsor and the neighbourhood by the Albert Institute and the various societies associated with it.

COMMENT was made in this journal on a recent date respecting the enemies of frogs. Mr. W. August Carter, of the Fisheries Section of the Colonial and Indian Exhibition, has made further observations upon the subject, and finds that the tortoise must be added to the list of foes. With a view of substantiating this fact Mr. Carter placed some medium-sized frogs with several tortoises of the same dimensions, when the latter immediately attacked them ferociously, and held them firmly by the legs, notwithstanding their efforts to escape. The tortoises were, however, unable to devour more than a portion of the leg, which they did with much apparent difficulty, the frogs afterwards escaping, but only to be recaptured and similarly treated. Considering the tortoises measured only $1\frac{1}{4}$ inches in length, they displayed remarkable courage, whilst their agility was certainly greater than that usually displayed by these members of the Chelonian family.

A VERY large specimen of the Ascension turtle died at the Colonial and Indian Aquarium last week. It was the only one of this species on view, and had been the object of considerable notice on account of its colossal proportions. As a further proof of the tenacity of life amongst turtles, it may be remarked that this particular specimen had existed more than two months without food. At its death 100 eggs were found in it, the retention of which doubtless proved fatal to the turtle.

THE additions to the Zoological Society's Gardens during the past week include an Ourang-Outang (*Simia satyrus* ♀) from Borneo, presented by Mr. H. H. Riccard; a White-handed Gibbon (*Hylobates lar*) from the Malay Peninsula, a Binturong (*Arctictis binturong* ♂), a White-whiskered Paradoxure (*Paradoxurus leucomystax*) from Malacca, presented by Mr. Dudley Hervey; a Binturong (*Arctictis binturong*) from Malacca, presented by Capt. Robert Hay; a Common Genet (*Genetta vulgaris*), South European, presented by Mr. J. Church Dixon; a Macaque Monkey (*Macacus cynomolgus* ♂) from India, presented by Miss Grace Balfour; a Green Monkey (*Cercopithecus callitrichus* ♂) from West Africa, presented by Mr. Duncan Armstrong; an Indian Civet (*Viverricula malaccensis* ♂) from India, presented by Capt. Archibald Douglas, R.N.; a Herring Gull (*Larus argentatus*), British, presented by Mr. C. A. Marriott; two Black-billed Tree Ducks (*Dendrocygna arborea*), a Violaceous Night Heron (*Nycticorax violaceus*), a Brazilian Cormorant (*Phalacrocorax brasilianus*), a Fugitive Snake (*Dromicus fugitivus*) from the Bahamas, presented by Mrs. E. Blake; two Mexican Guans (*Penelope purpurascens*) from Mexico, presented by Mr. E. A. Clowes; a Garden's Night Heron (*Nycticorax gardeni*) from St. Kitts, West Indies, presented by Dr. A. Boon, F.R.C.S.; seven Common Vipers (*Vipera berus*), from Hampshire, presented by Mr. Walter Blaker; four Three-toed Sand Skinks (*Seps tridactylus*), South European, presented by Mr. J. C. Warbury; a Puma (*Felis concolor*) from South America, a White-handed Gibbon (*Hylobates lar*) from the Malay Peninsula, ten Adorned Ceratophrys (*Ceratophrys ornata*) from Buenos Ayres, deposited; two Viscachas (*Lagostomus trichodactylus* ♀ ♀), two Crossed Vipers (*Craspedocephalus alternatus*) from Buenos Ayres, a South American Flamingo (*Phanicopterus ignipalliatu*), a Roseate Spoonbill (*Platalea ajaja*) from South America, a Harnessed Antelope (*Tragelaphus scriptus*), two Balearic Cranes (*Balearica pavonina*) from West Africa, two Lineated Kaleeges (*Euplocamus lineatus* ♂ ♀) from Tenasserim, a Porose Crocodile (*Crocodilus porosus*) from Ceylon, a Bald Ouakari (*Brachyurus calvus* ♂) from Brazil, purchased; a Burriel Wild Sheep (*Ovis burriel*), born in the Gardens.

OUR ASTRONOMICAL COLUMN

THE MELBOURNE OBSERVATORY.—We have received Mr. Ellery's Report, dated October 6, 1885, which refers to the year ending the previous June 30. The great reflector, after some slight repairs, readjustments, &c., is stated to be in excellent working order. The work done with this instrument has been chiefly confined to a revision of southern nebulae, already observed by former observers, preliminary to publication. One hundred and seventy-two nebulae have been re-observed and re-drawn to compare with the plates to be published. Many of these nebulae have been observed twice, and some three times, and none were completed until they had been observed on a first-class night. The new transit-circle with object-glass of 8 inches aperture, constructed by Messrs. Troughton and Simms, has been in continuous use for all the meridian work of the Observatory since August 22, 1884, and has proved very satisfactory in every respect. The number of right ascension observations obtained with this instrument since its erection was 2287, and the number of declination observations 983, comprising observations of a list of stars selected by Dr. Auwers for reduction of zone and Transit of Venus observations, stars observed with comets, and stars selected from the Melbourne zones. All the individual observations are completely

reduced. The second Melbourne general catalogue, containing the meridian results from 1871 to 1884 inclusive, thus incorporating the whole of the results obtained with the old transit-circle up to the date of its disuse, is in process of formation. An alteration has been made in the photo-heliograph, so as to secure a picture of 8 inches diameter instead of 4 inches, as formerly. There have been several interruptions to the continuity of the sun-photographs during the year, owing to derangement of the instrument and dome, and only 130 pictures were obtained up to June 11, when the instrument was dismantled for repairs. The sixth volume of the results of astronomical observations for the years 1876 to 1880 inclusive, was published in February 1885, and has been distributed. The first part of the observations with the great Melbourne telescope (*NATURE*, vol. xxxiii. p. 538), from its erection in 1869 to the present date, has also been published during the year to which this Report refers.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1886 JUNE 20-26

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on June 20

Sun rises, 3h. 44m.; souths, 12h. 1m. 14' 53".; sets, 20h. 18m.; decl. on meridian, 23° 27' N.: Sidereal Time at Sunset, 14h. 14m.

Moon (four days after Full) rises, 22h. 7m.*; souths, 2h. 49m.; sets, 7h. 36m.; decl. on meridian, 15° 34' S.

Planet	Rises h. m.	Souths h. m.	Sets h. m.	Decl. on meridian
Mercury ...	4 17 ...	12 45 ...	21 13 ...	24 57 N.
Venus ...	1 50 ...	9 14 ...	16 38 ...	15 14 N.
Mars ...	11 28 ...	17 45 ...	0 2* ...	2 41 N.
Jupiter...	11 40 ...	17 56 ...	0 12* ...	2 19 N.
Saturn...	4 40 ...	12 50 ...	21 0 ...	22 37 N.

* Indicates that the rising is that of the preceding evening and the setting that of the following morning.

Occultations of Stars by the Moon (visible at Greenwich)

June	Star	Mag.	Disap.	Reap.	Corresponding angles from ver- tex to right for inverted image
21 ...	B.A.C. 7487 ...	6½ ...	0 36 ...	1 55 ...	89° 258
24 ...	24 Piscium ...	6½ ...	0 43 ...	1 47 ...	87 241

June 21 ... Sun at greatest declination north; longest day in northern latitudes.

Variable Stars

Star	R.A. h. m.	Decl. °	June 24, h. m.
U Cephei ...	0 52' 2 ...	81° 16' N. ...	1 14 m
R Virginis ...	12 32' 7 ...	7 37' N. ...	25, m
W Virginis ...	13 20' 2 ...	2 47' S. ...	26, 2 20 M
δ Libræ ...	14 54' 9 ...	8 4' S. ...	26, 23 32 m
U Coronæ ...	15 13' 6 ...	32 4' N. ...	20, 20 41 m
U Ophiuchi...	17 10' 8 ...	1 20' N. ...	21, 2 14 m
and at intervals of 20 8			
X Sagittarii...	17 40' 4 ...	27 47' S. ...	June 26, 2 0 M
U Sagittarii...	18 25' 2 ...	19 12' S. ...	22, 3 0 M
β Lyræ ...	18 45' 9 ...	33 14' N. ...	26, 21 30 M
η Aquilæ ...	19 46' 7 ...	0 43' N. ...	23, 22 0 m
T Delphini ...	20 40' 1 ...	15 59' N. ...	23, M
δ Cephei ...	22 24' 9 ...	57 50' N. ...	22, 2 30 m
R Pegasi ...	23 0' 9 ...	9 56' N. ...	25, M

M signifies maximum; m minimum.

GEOGRAPHICAL NOTES

THE paper on the aborigines of Formosa, by Mr. G. Taylor, in the *China Review*, to which we have already adverted, is continued in the last number (vol. xiv. No. 4), and as it progresses it contains more and more information, especially with regard to the number of different tribes and their various customs, which is wholly new, either in European publications or in those of the Far East. The number last noticed concluded with the

Paiwans, the tribe with which the Dutch came in contact in the seventeenth century, during their temporary occupation of part of Formosa, and of which therefore we had the most information. The present instalment deals with several other tribes, including one very peculiar and hitherto unknown people, the Caviangans, who are comparatively few in number, inhabiting lofty mountains, and having many superstitions with regard to hills and the spirits which inhabit them. We have also an account of the Tipuns, the most powerful tribe in southern Formosa, inhabiting the great plain inland from the headland marked Double Peak on the charts of the east coast. These have a tradition that they came from some other country hundreds of years ago, but they appear now to differ little from their neighbours the Paiwans. But there is one very radical distinction, viz., that when a man marries he enters his wife's family, whereas amongst the Paiwans the reverse is the case. Amongst them tattooing is a mark of rank, and is strictly prohibited to the commonalty. Another tribe described is the Amias. The Chinese class these as aborigines, but the true aboriginal tribes look on them as foreigners. They have a curious tradition of their origin, but the aborigines have the more prosaic one of shipwreck, and it appears that the Amias do not consider themselves entitled to equal social rank with the other savages. In appearance and customs they differ much from their neighbours, and worship one Supreme Being, not a multitude of spirits. They believe in an after state, dependent on personal conduct in this life, and they have a sort of purgatory amongst their beliefs. They have a vague notion of lands and peoples where communication is carried on by means of other than oral speech. This, says Mr. Taylor, is the only trace in South Formosa of any original idea of writing. Their explanations of certain natural phenomena, such as thunder and lightning, sunset and sunrise, are curious. Earthquakes they believe to be caused by a pig scratching itself against an iron bar stuck into the earth. This paper leaves on the mind, even more strongly than its predecessor, the impression that in the future Formosa will offer ethnological problems as interesting and complicated as any equal area on the earth's surface. It is clear, too, that all the divisions of the inhabitants of the island hitherto given by writers, whether Chinese or Europeans, are wholly incorrect and unscientific. There are wider differences amongst the tribes, and a far greater number of different tribes, than has ever been supposed. Moreover, it is obvious that in the present state of our knowledge of the tribes, it would be idle to theorise about them. Mr. Taylor, dealing only with a very small section in the south of the island, has described six or seven tribes; amongst these we find some calling themselves aborigines, and looking down as strangers and new-comers on others who have been generally supposed to be aborigines. In view of the wild and inaccessible nature of a large part of the eastern half of Formosa, and of the danger of entering it on account of the chronic state of war which exists between the natives and their Chinese masters, it must be a long time before a clear or trustworthy ethnological account of Formosa can be written. It is quite possible that some of the largest ethnological problems of the Far East may be involved in Formosa; the knot may, perhaps, lie there. Meantime, Mr. Taylor deserves thanks for his careful and interesting collection of new facts which are vital to the discussion of Formosan ethnology.

A REPORT addressed by Col. Fontana, the Governor of Chubut, to the President of the Argentine Republic, gives details of the exploration of Chubut up to the Andes lately made by the Governor. The Expedition, consisting of thirty men, left Raiwon, the chief town of Chubut territory, on October 14, and returned on February 8, having traversed about 1000 leagues in four months. It first followed the tortuous course of the Rio Chubut to its source in the Cordilleras, about the 42nd degree south latitude, the northern limit of Chubut, and then, crossing well-watered and fertile prairies and enormous forests, reached the 46th parallel. It discovered three passages into Chili, and laid down accurately the courses of several rivers heretofore fixed by guess-work. Col. Fontana believes he was the first to quench his thirst in the spring from which the River Senger takes its rise: he has removed the doubts which existed respecting Lakes Colne and Musters, and verified their positions; and he has determined the geographical position of the spots at which the Senger and Chico debouch into the lake. He promises in a short time to have completed maps which will correct many errors concerning the hydrography and orography of this region.